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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,574	07/01/2003	Franco D'Alessandro	ERICP0343US	5171

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EXAMINER
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WILLOUGHBY, TERRENCE Ronique

ART UNIT	PAPER NUMBER
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2836

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

42

<b>Office Action Summary</b>	<b>Application No.</b> 10/611,574	<b>Applicant(s)</b> D'ALESSANDRO, FRANCO	
	<b>Examiner</b> Terrence R. Willoughby	<b>Art Unit</b> 2836	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>October 7, 2003</u> .   | 6) <input type="checkbox"/> Other: ____                                     |

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: On page 14, paragraph [0056] and on page 15, [0057], "Figure 3" is incorrectly referenced and should be changed to "Figure 4" which depicts the variable impedance unit 48 to be consistent with the drawing figures.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10, 15-17, 20, 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable by Gumley (US 6,320,119) and in view of Rapp (US 6,649,825).

With respect to claim 1, Gumley teaches the claimed lighting protection device (Fig 2) comprising: a grounded central rod (Fig. 2, elements 21 and 22) a conductive tip (Fig. 3, element 34) coupled to the central rod; a curved conductive shell (Fig. 2, element 24) capacitively spaced from the tip and the central rod, with an annular gap (Fig. 2, element 32) between the conductive shell and the tip that functions as a spark gap; and an electrical connection (Fig. 2, elements 42 and 43) joining the conductive shell to ground. Gumley teaches the claimed said device wherein the tips impart

different electrical characteristics to the lighting protection device (Column 3, lines 10-28). Gumley lacks the claimed said device wherein the conductive tip is one of a set of tips that may be coupled to the tip mount of the central rod. However, Rapp teaches a lightning protection system with a rod and a conductive tip, which is one of a set of tips (Fig. 1-5, elements 5) that may be coupled to a tip mount (Fig. 1, element 6) of the central rod (Fig. 1-5, elements 3 and 3/9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a set of conductive tips coupled to the tip mount of the central rod taught by Rapp to the lighting protection device of Gumley to minimize the pre-discharge corona by providing suitable radius or diameter dimension of the conductive tips and to provide a safer lightning protection system by installing less pointed conductive tips.

With respect to claim 2, Gumley in view of Rapp teaches the claimed said device. Rapp discloses that the set of tips (Fig. 1-5 elements 5) includes tips with different radii of curvature at free ends opposite ends for coupling to the tip mount (Fig. 1, element 6), thereby changing the electrical characteristics of the device. The different radii of curvature will necessarily change the electrical characteristics based on the radius and diameter of the conductive tip.

With respect to claim 3, Gumley in view of Rapp teaches the claimed said device. Gumley discloses a tip, which has a free end with a generally conical shape (Fig. 3, 34);

wherein the protruding end protrudes from the curved conductive shell (Fig. 2, 24) when the tip is coupled to the tip amount.

With respect to claim 4, Gumley in view of Rapp teaches the claimed said device. Gumley discloses another tip, which has a free end with a generally hemispherical shape (Fig. 1, 18).

With respect to claim 5, Gumley in view of Rapp teaches the claimed said device. Rapp discloses that the set of tips (Fig. 1-5, elements 5) includes tips with at least three different radii of curvature at respective free ends of the tips.

With respect to claim 6, Gumley in view of Rapp teaches the claimed said device. Rapp discloses that the set of tips (Fig. 1-5 elements 5) includes tips with different diameters coupled to the tip mount (Fig. 1, element 6), which would thereby produce annular gaps of different widths when coupled to the tip amount.

With respect to claim 7, Gumley in view of Rapp teaches the claimed said device. Rapp discloses that the set of tips (Fig. 1-5, elements 5) includes tips with at least three different diameters.

With respect to claim 8, Gumley in view of Rapp teaches the claimed said device. Rapp discloses the set of tips (Fig. 1-5, elements 5) with different radii of curvature at free ends opposite ends for coupling to the tip mount (Fig. 1, element 6).

With respect to claim 9, Gumley in view of Rapp teaches the claimed said device. Rapp teaches the claimed device wherein the set of tips (Fig. 1-5, elements 5) includes at least three tips with unique diameters-radii combinations; wherein each of the tips has a unique radius of curvature; and wherein each of the tips has a unique diameter.

With respect to claim 10, Gumley in view of Rapp teaches the claimed said device. Gumley discloses the electrical connection (Fig. 2, elements 42 and 43) is a connection between the conductive shell (Fig. 2, element 24) and the central rod (Fig. 2, element 21).

With respect to claim 15, Gumley in view of Rapp teaches the claimed said device. Gumley discloses the shell has an oblate spheroidal (Column 7, lines 6-10) shape.

With respect to claim 16, Gumley in view of Rapp teaches the claimed said device. Gumley discloses the claimed said device wherein the shell is an upper half (Column 7, lines 62-65) of an oblate spheroid.

With respect to claim 17, Gumley in view of Rapp teaches the claimed said device. Gumley discloses a shell (Column 12, lines 10-11) but does not teach the shell having a height of from 0.25 to 0.5 times a diameter of the shell. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use

these chosen values based on the dimension and shape of the structure on which the lighting device is installed since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 102 USPQ 233.

With respect to claim 20, Gumley teaches the claimed said device comprising insulating support (Element 25) connected to both conductive shell (Fig. 2, element 24) and the central rod (Fig. 2, element 21).

4. Claims 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gumley (US 6,320,119) in view of Rapp (US 6,649,825) and in further view of Gumley (WO 94/17578).

With respect to claim 18, Gumley (US 6,320,119) in view of Rapp teaches the claimed said device however does not disclose that the shell is a stainless steel shell. However, Gumley (WO 94/17578) discloses a lightening protection device with a shell which is stainless steel (page 5, lines 12-13 and lines 19-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a durable material such as stainless steel as taught by Gumley (WO 94/17578) to withstand the impact of a lighting strike.

With respect to claim 19, Gumley (US 6,320,119) in view of Rapp and Gumley (WO 94/17578) discloses the claimed invention as mentioned above in claim 18, except for the stainless shell having a thickness of at least about 3mm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a thickness of at least 3mm such to withstand the impact of a lighting strike, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2c 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 27, Gumley in view of Rapp teach the claimed said protection device using a lightning protection device comprising: controlling electric field distribution characteristics in the vicinity of the device; and controlling spark production characteristics of the device, wherein the controlling the spark production characteristics includes: controlling width of a spark gap between a central grounded rod of the device and a conductive shell of the device; and providing an electrical connection between the central grounded rod and conductive shell.

With respect to claim 28, Gumley in view of Rapp teach the claimed said method wherein the controlling the electrical field characteristics includes selecting a tip for coupling to a tip amount of the central rod, from a tip set including a plurality of tips (Rapp Fig. 1-5, element 5); and wherein at least some of the plurality of tips include tips with different radii of curvature at free ends of the tips.



With respect to claim 29, Gumley in view of Rapp teach the claimed method for controlling the width of the spark gap includes selecting a tip for coupling to a tip mount (Rapp Fig. 1, element 6) of the central rod (Rapp element 3 and 3/9). Rapp discloses a set of tips, which include tips with different diameters coupled to the tip mount (Fig. 1, element 6). It is well known in the art that conductive tips with different radii of curvature necessarily provide different air gap between the curved conductive shell and the central rod connected to ground.

With respect to claim 30, please see the recited method for rejection as mentioned above in claim 29.

With respect to claim 31, Gumley in view of Rapp teaches the claimed said method wherein each of the plurality of tips (Rapp Fig. 1 element 5) has a unique combination of radius of curvature and diameter.

With respect to claim 32, Gumley in view of Rapp teaches the claimed said method wherein the selecting the tip includes selecting a tip based on a height of a structure to which the lighting protection device is coupled (Gumley Column 8, lines 1-3).

5. Claims 11-14,22-26,33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gumley (US 6,320,119) and Rapp (US 6,649,825) and in further view of Fowler et al. (US 6,683,772).

With respect to claim 11, Gumley and Rapp teach the claimed said device wherein the electrical connection (Fig. 2, 42 and 43 and Column 4, lines 9-19) but lacks variable impedance. However, Fowler et al. teaches lightening protection system with a variable impedance unit 7, such as metal oxide varistors (MOV) or zener diodes (Column 4, lines 65-67). It would have been obvious to one of the ordinary skill in the art at the time the invention was made to provide a variable impedance (resistor) inside the electrical connection, which is connected between the conductive shell of Gumley to reduce the effects of lighting surge between the conductive shell and the central rod.

With respect to claim 12, Fowler et al. teaches the said device wherein the impedance (resistance) of the variable impedance unit connected between a conductive wire and electronic equipment (Column 4, lines 65-67). Gumley teaches the claimed said high impedance (resistance) connected between the conductive shell (Fig. 2, element 24) and the central rod (Fig. 2, elements 21 and 22).

With respect to claim 13, Gumley in view of Rapp and Fowler et al. teach the claimed said impedance decreases at at least one point as the voltage difference increases.

With respect to claim 14, Gumley teaches the claimed said device wherein the electrical connection includes a resistor in parallel with a capacitor discharge circuit (Column 4, lines 20-26). Gumley lacks the claimed said transorb in parallel with a resistor. However, Fowler et al. teaches using a varistor or zener diode (Column 4, lines 65-67). It is well known in the art at the time the invention was made that a varistor, such as metal oxide varistor (MOV), or zener diode or transorb which are art recongnized as suitable for the intended purpose of providing a variable impedance. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gumley variable impedance unit by providing a zener diode or transorb taught by Fowler et al. in parallel with the resistor to control to voltage between to conductive curvature shell and the central rod to reduce the pre-charge corona field.

With respect to claim 22, Gumley teaches the claimed lighting protection device (Fig 2) comprising: a grounded central rod (Fig. 2, elements 21 and 22); a conductive tip (Fig. 3, element 34) coupled to the central rod; a curved conductive shell (Fig. 2, element 24) capacitively spaced from the tip and the central rod, with an annular gap (Fig. 2, element 32) between the conductive shell and the tip that functions as a spark gap (Column 4, lines 4-15); and an electrical connection (Fig. 2, elements 42 and 43) between the conductive shell (Fig. 2, element 24) and the central rod (Fig. 2, element 21). Gumley teaches the claimed said device wherein the tips impart different electrical

Art Unit: 2836

characteristics to the lightning protection device (Column 3, lines 10-28). Gumley lacks the claimed said device wherein the conductive tip is one of a set of tips that may be coupled to the tip mount of the central rod. However, Rapp teaches the claimed said conductive tip is one of a set of tips (Fig. 1-5, elements 5) that may coupled to the tip mount (Fig. 1, element 6) of the central rod (Fig. 1-5, elements 3 and 3/9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a set of conductive tips coupled to the tip amount of the central rod taught by Rapp to the lightning protection device of Gumley to minimize pre-discharge corona charges in the streamer by providing suitable conductive tips with unique radius and diameter dimension and to provide a safer lightening protection system by installing less pointed conductive tips. Both Gumley and Rapp do not teach providing a variable impedance unit in the electrical connection. However, Fowler et al. discloses a lightening protection system with variable resistor 7, such as a metal oxide varistor or zener diode (Column 4, lines 65-67). It would have been obvious to provide a variable resistor as taught by Fowler et al. in the lightening protection system of Gumley and Rapp to provide a variable resistance which does not significantly alter impedance unless a surge occurs.

With respect to claim 23, Fowler et al. teaches the claimed said method wherein the impedance (resistance) of the variable impedance unit is a function of a voltage difference between the conductive shell and the central rod.

With respect to claim 24, Fowler et al. teaches the claimed said method wherein the impedance decreased at at least one point as the voltage difference increases (Column 4, lines 20-26). It is well known in the art at the time the invention was made that a varistor, such as metal oxide varistor (MOV), or zener diode or transorb which are art recongnized as suitable for the intended purpose of providing a variable impendance and may be used to meaure the impedance at a given threshold or fixed point where the voltage difference increases.

With respect to claim 25, the configuration of Gumley in view of Rapp and Fowler et al. would provide an impedance which decreases in a stepwise manner at at least one value of the voltage difference.

With respect to claim 26, please see the recited method for rejection as mentioned above in claim 14.

With respect to claim 33, Gumley and Rapp do not teach providing a variable resistance. However, Fowler et al. teaches the claimed said method wherein the providing the electrical connection includes providing a variable resistance (impedance) electrical connection. It would have been obvious to provide a variable resistor as taught by Fowler et al. in the lightening protection system of Gumley and Rapp to provide a variable resistance which does not significantly alter impedance unless a surge occurs.

With respect to claim 34, Gumley and Rapp and Fowler et. al teach the claimed said method wherein providing a variable resistance electrical connection (Fowler element 7); and wherein resistance of the variable resistance electrical connection is a non-constant function of a voltage difference between the shell and the central rod (Abstract, lines 10-15).

With respect to claim 35, Fowler et. al teaches the claimed said method wherein the resistance decreases as the voltage difference increases (Column 4, lines 20-26).

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gumley (US 6,320,119) and in view of Rapp (US 6,649,825) and in further view of Mansfield et al. (US 5,652,690).

With respect to claim 21, Gumley and Rapp teaches the claimed said device as recited in claim 20 above, but lacks the claimed said vented support. However, Mansfield et al. teaches using vented supports (Column 1, lines 25-28). It would have been obvious to one of the ordinary skilled in the art at the time the invention was made to use a vented support taught by Mansfield et al. to allow hazardous gases from escaping the interior of the lighting device taught by Gumley and Rapp.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terrence R. Willoughby whose telephone number is 571-272-2725. The examiner can normally be reached on 8-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TRW



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**PRIMARY EXAMINER**